On the Relation between Graphitization and Cooling Conditions of Partially Arc Melted Cast Iron

On the Relation between Graphitization and Cooling Conditions of Partially Arc Melted Cast Iron*

Katsunobu YAMAYA

The Research Institute for Iron, Steel and Other Metals

Abstract

Effect of cooling conditions on the graphitization of partially arc melted cast irons were investigated. As test specimens, the cast iron containing ab. 3.3 per cent carbon and 1.5 per cent silicon were used. For the cast iron specimen melted in the central position in TIG arc, various heat-treatments were carried out and annealed at 750°C~850°C.

The following results were obtained.

(1) When the arc melting time was increased, tempered graphites became larger, because of the slow cooling rate of the treated specimens.

(2) When the specimens were quenched into oil or water after the arc melting, the tempered graphite sizes were almost the same regardless of the time of arc melting.

(3) When the cooling rate from molten metal to room temperature increased, a fine tempered graphite was obtained, especially by a rapid cooling from ab. 850°C. A heat-treatment to stabilize the structure before the graphitizing treatment made it difficult to obtain a fine tempered graphite.

The results of the present study indicate that in the practical welding of cast iron, pre- and post-heat treatments make the graphitization difficult with the rise of the temperature, because of the decrease of the cooling rate on the weld part.

* The **1224th** report of the Research Institute for Iron, Steel and Other Metals. Published in the Journal of the Japan Institute of Metals, **29** (1965), 714.